LCLS Room Data Sheet #	1.9-1020	Near Experimental Hall (NEH) - Hutch 3	Revision 2

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REVISION INFORMATION

Rev 2. changed 110 v, 20 A, deleted floor drain, added wall penetration figure, added nitrogen boil off station

added variable speed control to fans, updated fig 1, deleted list of equipment that was given as an example only

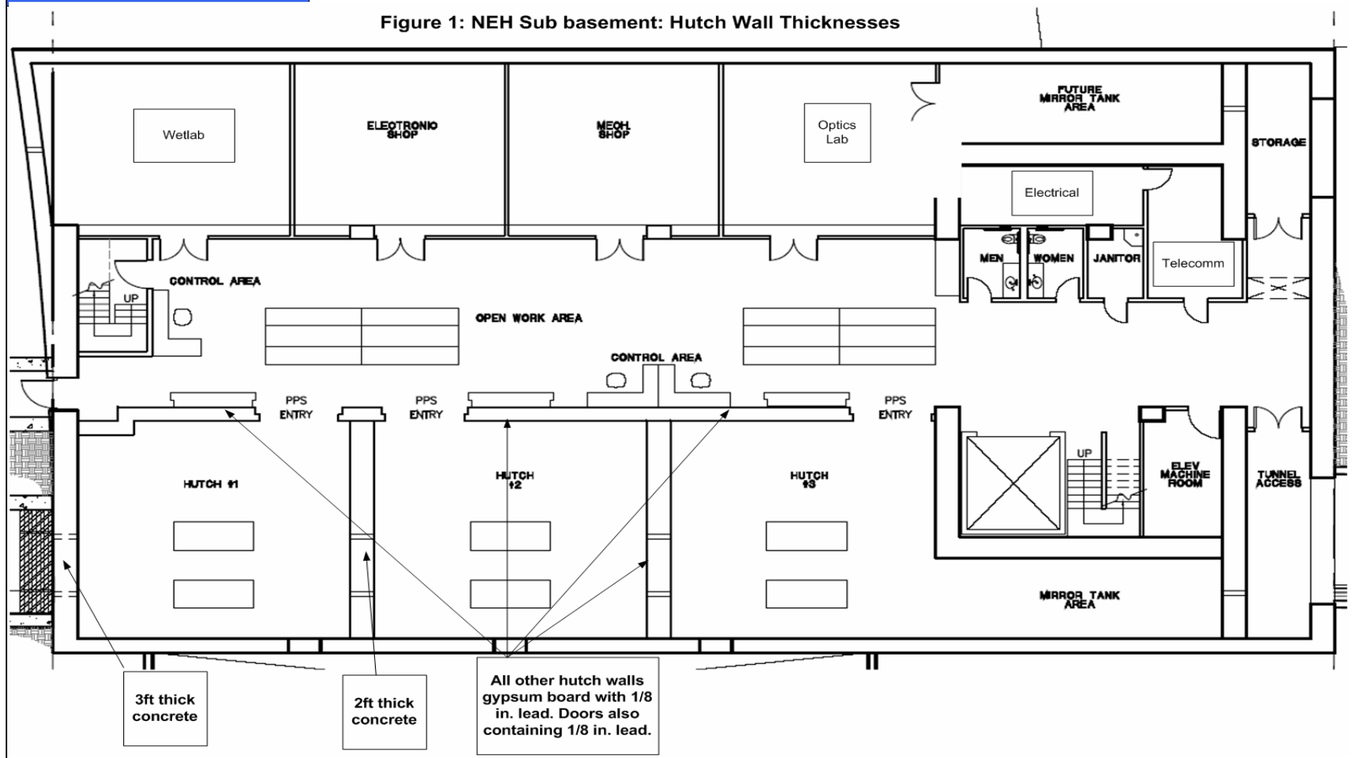
HUTCH 3 - NEH ROOM DATA SHEET

Name of Building	LCLS Experimental Facility			
Organization or Department	SLAC, Stanford University			
Net area	122.0	sq. meters	~1313sf	
Critical dimensions	**H:**	4.5 m	15'-0"	
	W:	9.5 m	31'-2"	
	L:	10.0 m	32'-9"	
Hours of operation	24/7/365			
Users/Occupancy	5			
Building orientation	Located along the beam line on the Sub-basement level.			

FUNCTIONAL OBJECTIVE	To conduct a variety of experiments with the the high energy X-ray beam. One of the hutches in the NEH also houses special optical devices, that help split the X-ray beam into the +/- 3/4 degree beams. For hutch layout see figure 3.	
PLANNING CONSIDERATIONS & CRITICAL FACTORS	Floor level is to remain constant throughout the entire length of the hutches at 1.4m below the beam axis. Y = - 0.895305m in LCLS coordinate system (Refer to LCLS-TN-03-8). Each hutch should have it's longer side parallel to the direction of beam travel. The hutches should be capable of independent operations. Refer to document: LCLS Vibration Specification A and B. Hutch 3 includes the mirror tank area with tighter vibration criteria A for the floor.	
FINISHES	Wall	Reinforced concrete, painted surface and 1/8in. Lead for some of the hutch walls (see figure 1 for wall thicknesses required for radiation safety requirements). Penetrations can not allow line of sight to beamlines. (See figure 2 below)
	Ceiling	Reinforced concrete, painted surface. 15'-0"high. Remains 3 ft thick (see Title I). Exposed concrete structure with suspended Unistrut framing grid capable of supporting experiment specific diagnostic equipment on suspended shelf below the ceiling above each laser table. Each shelf estimated weight is 500 lbs each. Bottom of unistrut framing grid: 12'-0"AFF
	Floor	sealed concrete with epoxy coating. Refer to LCLS General Concrete Specification Document.
	Base	None allowed.
	Doors	Sliding Hutch doors should contain 1/8" lead. Door runs in groove. No cracks. Door height 8"-0'. Width to allowed 5 ft entry space. Door must interface with special Personal Protection System(PPS). PPS provided by SLAC. Example of doors are similar to SSRL X-Ray hutch doors.
	Fenestrations	None
	Acoustical	None
APPLICABLE STANDARDS	29 CFR Part 1910 Occupational Safety and Health Standards Dept of Labor, 29 CFR Part 1926 Safety and Health Regulations for Constructions Dept of Labor, Uniform Building Code (UBC) 1997 including appendixes, National Electric Code (NEC) 2002, 2003 Uniform Mechanical Code (UMC) including appendixes, 2003 Uniform Plumbing Code (UPC) including appendixes, Uniform Fire Code (UFC) 1997 including appendixes, California Code of Regulations Title 8 Industrial Safety, Title 19 Public Safety, NFPA 70 National Fire Codes, National electrical Safety Code ANSI C2, Occupational Safety and Health Act (OSHA), General Services Administration 41 CFR part 101-19, Environmental Protection Agency 40 CFR Parts 264 and 265, SLAC Environmental Safety & Health Manual, General Industrial Activities Storm Water Permit (SLAC Permit), NFPA 101 life Safety Code, Title 24 Energy Code, DOE standard 10 CFR Part 435, ASHRAE/IES Standards 90.1, NFPA Standard 13 and SLAC Fire Marshal requirements, LCLS Cabling Standard and SLAC LOTO	

VIEWS & SCHEMATICS (N. T. S.)

Figure 1: NEH Sub basement: Hutch Wall Thicknesses



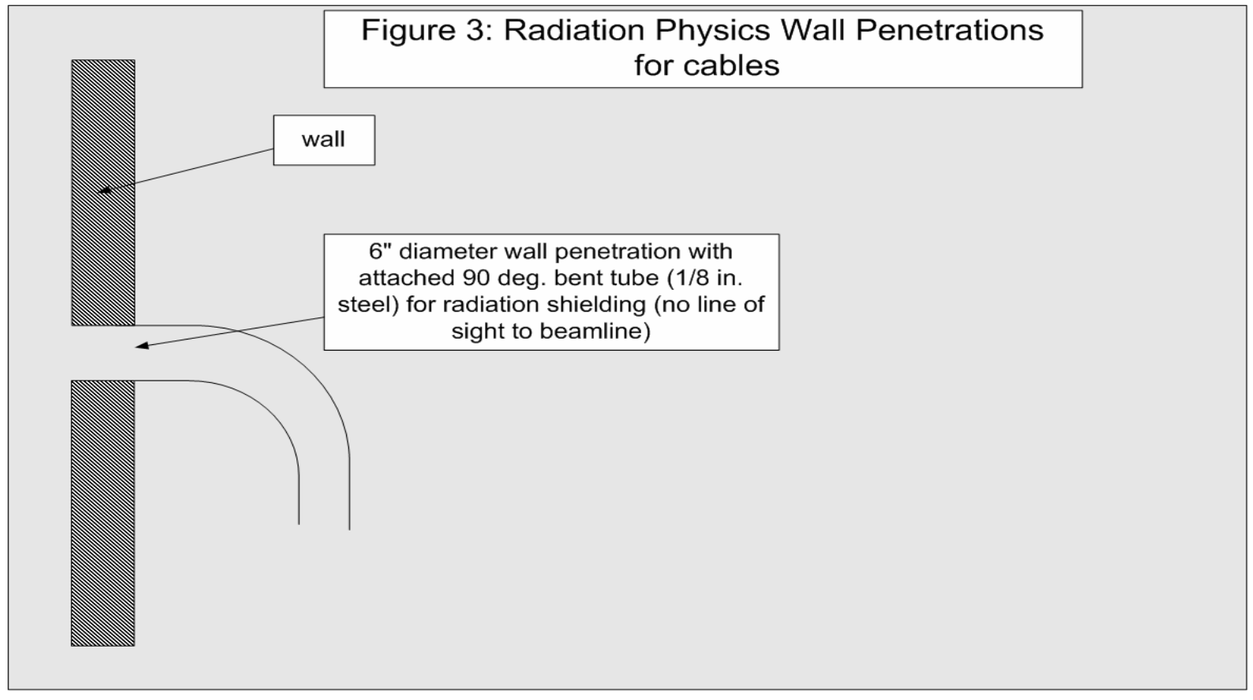
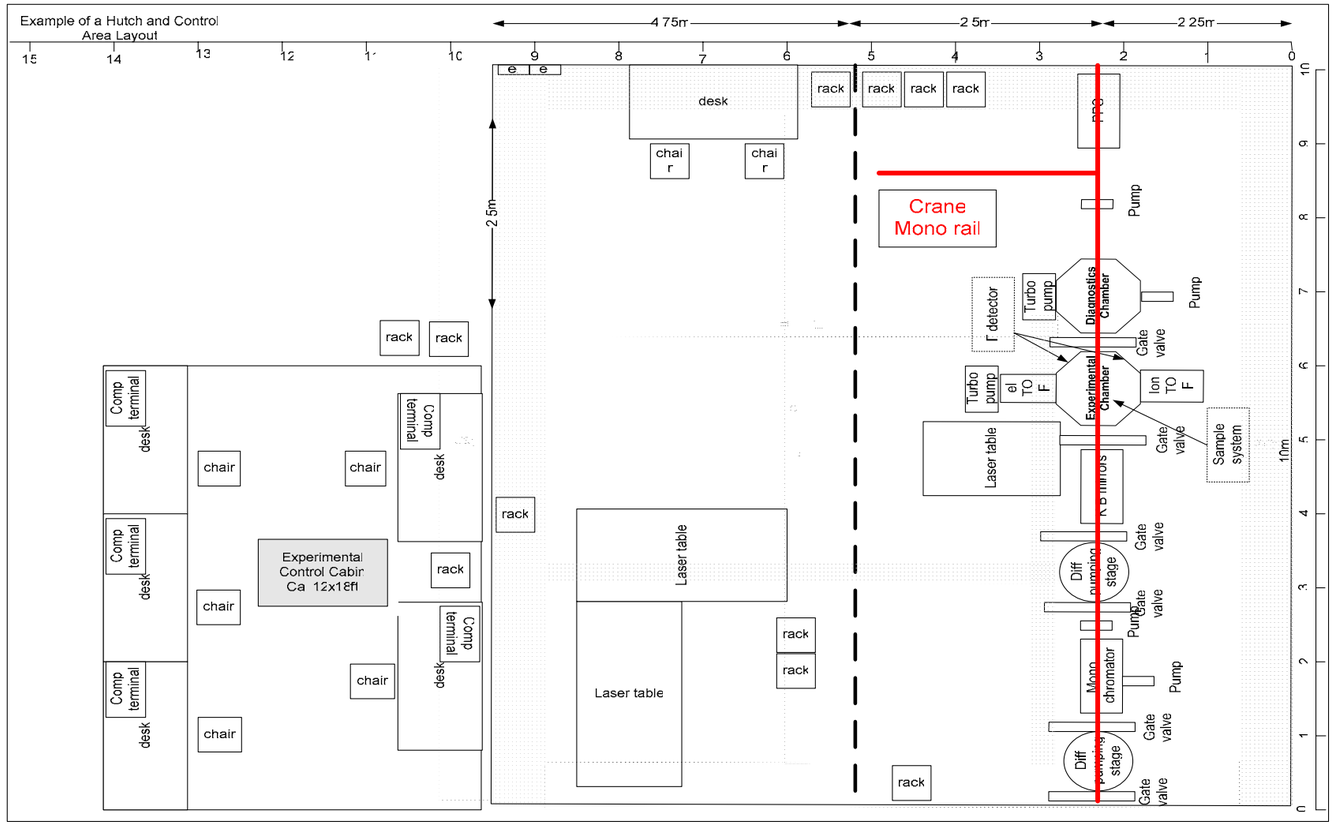


Figure 3: Radiation Physics Wall Penetrations for cables
wall
6" diameter wall penetration with attached 90 deg. bent tube (1/8 in. steel) for radiation shielding (no line of sight to beamline)

Figure 3


Example of a Hutch and Control Area Layout
4 75m
2 5m
2 25m
2 5m
10m
desk
chair
chair
rack
rack
rack
rack
rack
rack
rack
rack
rack
rack
Crane
Mono rail
Pump
Turbo pump
Diagnostics Chamber
Pump
Gate valve
Turbo pump
Experimental Chamber
Gate valve
Sample system
Laser table
Gate valve
Diff pumping stage
Gate valve
Pump
Mono chromator
Pump
Gate valve
Diff pumping stage
Gate valve
Comp terminal
desk
Comp terminal
desk
Comp terminal
desk
Comp terminal
desk
Experimental Control Cabir
Ca 12x18fl
chair
chair
chair
chair
Laser table
Laser table
rack

MECHANICAL REQUIREMENTS	**HVAC**	☒	Heating system	Temp:	☐	Mechanical humidification	
	Provide filtered clean air using pre-filters, high efficiency filters and HEPA filters in the air handling unit. 6 FPM average room velocity or less.	☒	Air conditioning	Temp: 72 degrees F+ 1 degree F	☒	Direct exhaust system	
		☐	Direct supply		☐	Positive pressure system	
		☐	Indirect supply		☐	Negative pressure system	
		☐	Smoke control system		☐	Standard registers	
		☒	Temperature sensors for DDC system		☒	Requirement for gases	
		List of Gases - Provide piping to 3 hutches and laser room for N2 gas from Nitrogen boil off station to be located outside near service dock, right outside staircase on first parking lot. **Centralized Mechanical Utilities:** Clean dry oil-free compressed air 20 SCFM, 100 psig. Provide one location (concrete wall) with shut off valve and pressure gauge per hutch.			1. Noise criteria: 35 NC. 2. Temperature fluctuation to be maximum of +/- 1 deg F for stability.Relative Humidity (RH)- shall be controlled to 45% +/- 10%. 3. At least 200 CFM exhaust duct (6") for process exhaust at 1.5"W.C. static pressure for each hutch on separate fan for each hutch (with variable speed control).		
	Communications	☒	Telephone- 2 phone lines/location		☐	PA speakers	
		☒	Dataport- 2 jacks/location		☐	PA station	
		☐	Payphone		☐	CCTV camera	
		☒	Fire alarm station		☐	CCTV monitor	
		☐	Intercom				
		Comments: Provide two locations (data and voice) per wall (see figures in worksheet "NEH Overall").					
	Plumbing/Fire Protection	☐	Hot water system		☐	Electric watercooler	
		☒	Process cooling water		☐	Drinking fountain	
		☐	Tempered water		☒	Smoke detection systems with devices suitable for radiation environment	
		☐	Waste drain		☒	Wet Sprinkler System	
		☐	Floor drain		☐	Eye wash	
		☐	Trench drain				
		Comments: **Process Cooling water:** 10GPM, 25 PSI pressure drop at 68 F in each hutch. Terminate with shut off valve and pressure gauge. Locate piping on concrete wall. Refer to LCLS Water Cooling Specification					

ELECTRICAL REQUIREMENTS

Power supply

☐	208V outlets-1 phase- 30 amps	☐	Uninterrupted power supply
☒	110V, 1ph Double duplex outlets, 20 amps locate at 10ft apart on all walls.	☒	Special electric — Type:
☐	Emergency power		Provide two panels, 120-208 volts, 3 ph, (one "clean" and one "dirty" power) in each hutch. Each panel shall have a main breaker. All panels should have 20% spare capacity and additional breaker space. Capacity of each panel: **100** amps/**Panel location:** On walls between hutches next to door. (see figure in "NEH overall"). Power diversity 60%.

Comments:
1 - Each panel shall have a main 100 amp, 120-208volts, 3 ph, breaker.
Electrical distribution system in ceiling with vertical drops.
2 - The two panels will provide power to future experimental equipment.

Lighting

☒	Light fixtures	☐	Remote lighting control
☒	Fixture type I: Downlight	☒	Light switches
☐	Fixture type II: Bollard (exterior)		Lighting level — FC: 75
☒	Emergency lighting		

Comments:
1- All conduits are surface mounted. Low profile fixtures preferred.
2- No night lighting desired.
3- Must have the ability to completely darken the room when required by the particular experiment.
4- Lighting level should be higher than normal standard office environment due to the dark laser protective goggles worn by the lab personnel. **(75 FC)**.
5- Light fixtures could be located at the lower unistrut level, placing the fixtures as close to the worksurface as possible.

RADIATION/SEISMIC/VIBRATIONS ISSUES

Comments:
1- All equipment (HVAC, cable trays, panels, etc) and systems are to be seismically braced and restrained per Code.
2- Vibration criteria in the hutches: Refer to document: LCLS Vibration Specification B. (100 micro inch/sec.)
3- Vibration criteria for Mirror Tank Area (applicable to Hutch #3 only): Refer to document: LCLS Vibration Specification A. (30 micro-inch/sec)
4 - For cable penetration details, refer to figure 2. Allow for two 6 inch penetrations between hutches (one on each end)

SPECIAL REQUIREMENTS FOR EQUIPMENT

Comments:
1- Each hutch is equiped with a "L" shaped mono rail electric crane (capacity 1 ton, hook height 12ft) which runs above the beam line and has a loading area adjacent to it (see figure 7 in "NEH Overall").
2- Cabletrays: Double 12 inch to be installed along the inside walls of each hutch and along side hutch wall in control area and single 12in grid in each hutch . Provide cable trays at 8'-6" ft AFF (see figure 3 and figure in "NEH overall" for layout). Cable trays should be made from galvanized steel. Provide each cable tray with 1-4#0 bare copper wire for grounding. Provide 6" deep cable tray for I&C cables and control cables for DC racks, and 4" deep for cables for DC racks.

CHEMICALS / GASES

CHEMICALS

#	Chemical Type	Quantity

SPECIALTY GASES

#	Gas Type	Quantity

ENVIRONMENTAL NEEDS